

BEFORE THE
Federal Communications Commission
WASHINGTON, D.C. 20554

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OCT 16 1991

Federal Communications Commission
Office of the Secretary

In the Matter of)
)
Petition of Constellation)
Communications, Inc. for)
Amendment of Parts 2 and 25 of the)
Commission's Rules to Implement)
LEO Satellite Systems in the)
RDSS Bands)

RM-7771

To: The Commission

COMMENTS OF TRW INC.

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SUMMARY

In these Comments, TRW Inc. ("TRW") generally supports the petition for rule making that was filed by Constellation Communications, Inc. ("CCI"). Like CCI, TRW has petitioned the Commission to revise its rules to state that spread spectrum mobile satellite voice and data services that are technically compatible with radiodetermination satellite services ("RDSS") may be provided in the RDSS bands -- i.e., the frequency bands at 1610-1626.5 MHz and 2483.5-2500 MHz. Enhancing the use of the RDSS bands by allowing the introduction of mobile satellite voice and data services will enable the Commission to remain faithful to its longstanding policy favoring competitive multiple entry in the satellite arena.

Although TRW believes that its own proposal for the establishment of the "Mobile-Enhanced RDSS" presents the best way for the Commission to revitalize the RDSS service and act consistently with its open-entry policy, CCI makes several suggestions that should be adopted by the Commission. Specifically, the Commission should establish a renewal expectancy for RDSS-band nongeostationary satellite systems, in recognition of the substantial capital investments that will be required to bring the multiple-satellite constellations into operation. TRW also concurs with CCI's suggestion that the Commission should encourage the establishment of an industry committee to coordinate the implementation of nongeostationary satellite systems in the RDSS bands. Finally, while TRW agrees

with CCI that an expansion of the current S-Band allocation at 2483.5-2500 MHz would be beneficial, TRW emphasizes that the current allocation will be sufficient if the Commission adopts the modest relaxation of the band's power flux density limitations that are requested in TRW's petition for rule making.

There is one area, however, where TRW opposes CCI's petition. The Commission should not grant CCI's request that qualified applicants for RDSS-band systems be assigned specific frequency assignments of two or more megahertz in the 1610-1626.5 MHz band. Such an approach would effectively preclude all systems of a design other than CCI's. TRW's proposed approach, by contrast, would enable at least three of the five current proponents of nongeostationary RDSS-band systems to implement their systems as proposed.

In short, CCI makes a number of valuable suggestions concerning the RDSS band. With the exception of CCI's request for L-Band segmentation, CCI's proposals should be incorporated into TRW's pending proposal; TRW's proposal, as so supplemented, should be granted.

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To: The Commission

COMMENTS OF TRW INC.

TRW Inc. ("TRW"), by its attorneys and pursuant to Section 1.405 of the Commission's Rules, hereby submits its comments in response to the above-captioned petition for rule making filed by Constellation Communications, Inc. ("CCI").^{1/} Like CCI, TRW is an applicant for authority to establish a nongeostationary satellite system that would provide a combination of mobile voice and data, and radiodetermination

^{1/} CCI's petition for rule making included a request for pioneer's preference. By Public Notice, the Commission announced, inter alia, that CCI's request for pioneer's preference would be considered separately from its petition for rule making. See Public Notice, Requests of Constellation Communications, Inc. and TRW Inc. for a Pioneer's Preference (RM-7771 and RM-7773), DA 91-1100 (released August 29, 1991). Thus, TRW's comments here will not address those matters in CCI's petition that concern its request for a pioneer's preference.

satellite services in the 1610-1626.5 MHz and 2483.5-2500 MHz bands (the "RDSS bands").^{2/}

I. INTRODUCTION

On July 8, 1991, TRW filed a petition for rule making that seeks the amendment of Sections 2.106 and 25.141 of the Commission's rules in order to facilitate the establishment of what TRW calls the "Mobile-Enhanced Radiodetermination Satellite Service" ("M-E RDSS") in the RDSS bands.^{3/} TRW requested the Commission to revise its rules to state that spread spectrum mobile satellite voice and data services that are technically compatible with radiodetermination satellite services may be provided in the RDSS bands, and to relax modestly the current power flux density limitations in the 2483.5-2500 MHz band to accommodate spread spectrum mobile

^{2/} TRW filed its application for a twelve-satellite RDSS band system called "Odyssey" on May 31, 1991. See File No. 20-DSS-P-91(12). Along with TRW's proposed Odyssey system and CCI's proposed "Aries" system, three other nongeostationary satellite system proposals have been filed -- by Ellipsat Corporation, Motorola Satellite Communications, Inc., and Loral Cellular Systems Corporation -- for authority to use the RDSS bands. These five applications, and an application filed by American Mobile Satellite Corporation for authority to modify its proposed domestic geostationary mobile satellite system to include a portion of the RDSS bands, constitute the "June 3, 1991 processing group."

^{3/} See TRW Petition for Rule Making, RM-7773, filed July 8, 1991 ("TRW Petition").

voice and data transmissions.^{4/} TRW noted that its rulemaking proposal was fully consistent with the frequency allocation proposals the Commission made for the RDSS bands in its recommendations in preparation for the February 1992 World Administrative Radio Conference.^{5/} TRW also showed that its proposal for the M-E RDSS service is capable of being implemented pursuant to the basic qualifications criteria and service rules and policies the Commission already has in place for the radiodetermination satellite service, thereby minimizing necessary changes and reducing the amount of effort the Commission will have to expend in order to establish the proposed service.^{6/}

TRW's Petition proposes a spectrum allocation and licensing regime for the RDSS bands that is intended to serve as a blueprint for the Commission to follow as it addresses the applications filed by TRW, CCI, and the other members of the June 3, 1991 RDSS band processing group. The proposal is designed to maximize the number of applicants that will be able to implement their systems as proposed, while simultaneously

^{4/} TRW Petition at 1-2.

^{5/} Id. at 3-4 (citing An Inquiry Relating to Preparation for the International Telecommunication Union World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum, 6 FCC Rcd 3900, 3906 (1991) ("WARC Inquiry Report")).

^{6/} Id. at 4-5.

advancing several fundamental Commission policies (along, of course, with the national and public interest).

In these Comments, TRW agrees with CCI's call for a renewal expectancy for the RDSS band systems, and believes that its suggestion that an industry committee be established to coordinate operations among the nongeostationary RDSS band systems is basically a good one. TRW, however, opposes CCI's apparent request that qualified applicants be assigned specific frequency assignments of two or more megahertz in the 1610-1626.5 MHz band because it would have the effect of precluding all systems of a design other than CCI's.

TRW's specific points of agreement and disagreement are discussed below. TRW emphasizes, however, that it agrees with CCI that there are a myriad of public interest benefits to be garnered from a policy that favors multiple competitive nongeostationary satellite systems in the RDSS bands, and that the Commission should consider and adopt the requisite regulations as soon as practicable.

II. DISCUSSION

A. The Commission Should Consider Several Of CCI's Suggestions And Observations As It Determines The Regulatory Approach For The RDSS Bands.

1. The Commission Must Select A Proposal That Advances Its Policy Favoring Competitive Multiple Entry.

In its petition, CCI makes several meritorious suggestions and observations that the Commission should embrace as it considers TRW's and CCI's petitions for rule making in the RDSS bands. First, like TRW (see TRW Petition at 14-15), CCI emphasizes that the Commission must ensure that the regulatory scheme it establishes for the RDSS bands is faithful to the Commission's longstanding policy favoring competitive multiple entry in the satellite arena. See CCI Petition at 5-7. Competition fosters technical innovation and efficient pricing, and encourages service providers to be responsive to their customers' needs.

Open entry has been the hallmark of the Commission's satellite policies in general, and of the Commission's policy for the RDSS bands in particular.^{7/} In its RDSS Licensing

^{7/} See Amendment of the Commission's Rules to Allocate Spectrum for, and to Establish Other Rules and Policies Pertaining to, a Radiodetermination Satellite Service, Second Report and Order, 104 F.C.C.2d 650 (1986) ("RDSS Licensing Order").

Order, the Commission was faced with a decision between allocating spectrum for a service that would permit the establishment of multiple systems in the RDSS bands, and allocating spectrum for a less efficient proposal that would reduce the amount of spectrum available for competing systems. It found that the utilization of spectrum by multiple systems was the most consistent with the public interest.^{8/} The Commission cannot select a proposal that would preclude competitive multiple entry when a proposal or proposals that advance that goal exist.

2. The Commission Should Establish A Renewal Expectancy For RDSS Band Nongeostationary Systems.

One particularly noteworthy suggestion made by CCI is its assertion that the Commission should establish a renewal expectancy for nongeostationary satellite systems. See CCI Petition at 12-13. The design lifetimes of the component satellites proposed by the various RDSS band applicants range from a low of three years (for Ellipsat Corporation's Ellipso I satellites) to ten years (for TRW's Odyssey system satellites). In all instances, the proposed systems involve multiple satellites.

^{8/} Id. at 660-663.

Although the markets for the services to be provided by the RDSS band applicants are vast and largely untapped, it is unlikely that the enormous capital expenditures required to bring a multiple-satellite constellation into operation can be justified economically if the operator cannot proceed with reasonable certainty that it will be able to continue operation once its component spacecraft start expiring.^{9/} The Commission must include in its regulatory scheme for all nongeostationary systems a regulation that provides that replacement satellites will be authorized in the ordinary course -- i.e., unless the operator has acted in repeated material violation of the Communications Act or Commission rules or policies.

3. The Commission Should Encourage The Establishment Of An Industry Committee To Coordinate The Implementation Of Nongeostationary Satellite Systems In The RDSS Bands.

CCI's suggestion that the Commission establish a committee, comprised of RDSS band system operators, to

^{9/} It will take several years for some of the applicants to complete their launch programs, and commence operations with a full complement of satellites. After only a year or so of full-system operations on several of the proposed systems, the first satellites to be launched will be near the end of their design lifetimes, and plans for replacement will have to be undertaken. It is doubtful that operators will be willing or able to obtain financing to the tune of hundreds of millions of dollars (at a minimum) to pay for a system that they can confidently expect to be in full operation for only a year.

coordinate operations among the various systems is a good one. TRW believes, however, that such a committee cannot operate effectively until such time as the Commission specifies the basic technical guidelines that will apply to the systems operating in the RDSS bands (e.g., a requirement of single direction transmissions using code division multiple access spread spectrum techniques). The Commission should be in a position to make such a determination after it completes its action on TRW's pending Petition for Rule Making.

Once the Commission specifies the general technical conditions that will apply to the M-E RDSS, it will be necessary for the various applicants that are willing to conform to the requirements to specify how their systems will be implemented. Because of the magnitude of the undertakings, and the inherent complexity of nongeostationary operations, it would be productive if a standing industry group, sponsored and overseen by the Commission, were to attempt to address and resolve the fine-tuning and implementation issues.

An ongoing committee charged with these responsibilities should help expedite the initiation of services in the RDSS bands, and provide a valuable forum for the presentation of the inevitable ongoing coordination issues. Participation in the committee should be mandatory for RDSS band permittees, but the committee's determinations should

be presented in the form of recommendations for Commission review in the event that issues requiring Commission resolution arise. The committee should be structured so as to preclude the possibility of domination by a single party.

4. Although An Expanded S-Band Allocation Would Be Beneficial, The Current 16.5 MHz S-Band Allocation Will Be Ample With A Modest Relaxation Of The Power Flux Density Limitations.

CCI urges the Commission to develop a mechanism to add new frequencies for use by the RDSS band applicants "as licensees demonstrate demand that exceeds initial assignments." CCI Petition at 12. In recognition of the fact that current power flux density limitations in the 2483.5-2500 MHz S-Band segment of the RDSS bands may limit the amount of voice service that operators may provide, CCI also urges either a relaxation of the power flux density limitations or the allocation of a larger portion of the 2400-2500 MHz band for satellite downlinks. Id.

TRW agrees with CCI that additional spectrum for M-E RDSS systems would be desirable. Additional spectrum would enable more systems to operate in the frequency bands, enhance the capability of the currently-proposed systems to meet anticipated demand, or both. As TRW explained in its Petition, however, the current S-Band allocation is ample for the

establishment of the M-E RDSS, provided that there is a modest relaxation of the current power flux density limitations. See TRW Petition at 11-12. Indeed, TRW noted that if the S-Band power flux density limitation were eased by 10 dB, subscriber capacity would be doubled with little or no negative impact upon established users. Id. at 12-13, and Attachment.

At this time, it seems doubtful that additional spectrum beyond the current RDSS bands will be allocated internationally for use by the successful members of the June 3, 1991 processing group. The Commission's recommendations for primary spectrum allocations to the RDSS and mobile satellite services did not extend below 2483.5 MHz for space-to-earth transmissions.^{10/} Thus, TRW urges the Commission to focus its efforts on attempting to secure a relaxation of the power flux density limitations.

B. The Commission Should Not Assign Specific Frequency Segments Within The 1610-1626.5 MHz Band To Individual Applicants On An Exclusive Basis.

TRW opposes CCI's suggestion that "[a]ll applicants that are able to satisfy the Commission's technical, legal and financial qualification requirements should be treated in a similar manner and be granted a minimum of 2 MHz frequency in the 1610-1626 [sic] band and 16.5 MHz on a non-exclusive basis

^{10/} See WARC Inquiry Report, supra.

in the 2483.5-2500 MHz band." See CCI Petition at 10-11 (footnote omitted). Although it is not entirely clear from its petition, CCI apparently is requesting the Commission to adopt an L-Band allocation scheme that would be consistent with CCI's Aries application -- i.e., a scheme where each qualified applicant is assigned 2 MHz of the 1610-1626.5 MHz band on an exclusive basis for frequency division multiple access ("FDMA") uplink operations. See CCI Aries Application at 14-15, and Appendix A at 2, 18.^{11/}

If the Commission were to carve up the L-Band segment of the RDSS bands into two megahertz chunks as advocated by CCI, the only currently proposed system that could be authorized is CCI's Aries system.^{12/} In other words, CCI's spectrum allocation proposal would have the effect of precluding the system designs proposed by all of the other applicants, requiring them either to modify their proposals or abandon their plans. In contrast, approval of TRW's M-E RDSS proposal would allow three of the five nongeostationary system

^{11/} CCI would conduct downlink operations in the 2483.5-2500 MHz band using CDMA spread spectrum transmission techniques. Its petition for rule making requests the allocation of this band for mobile and RDSS services on a shared, non-exclusive basis.

^{12/} All of the other nongeostationary applicants in the June 3, 1991 processing group require use of the entire 16.5 MHz allocation, either on a shared or exclusive basis.

applicants in the June 3, 1991 processing group to implement their systems as proposed.^{13/}

The preclusive effect of the system design specified by CCI should prevent the Commission from even considering CCI's proposal unless CCI can demonstrate that its band-segmentation approach is unquestionably superior to the approaches selected by TRW and the other applicants.^{14/} CCI's petition does not contain such a demonstration -- and TRW is convinced that none can be made. Moreover, the public has not yet even had an opportunity to comment on the frequency plan proposed in CCI's Aries application.

Finally, TRW's proposal to maintain the current requirement for spread spectrum operations across the 1610-1626.5 MHz band represents a more efficient use of spectrum than does CCI's band-segmentation approach. Under

^{13/} In addition to TRW's Odyssey system, Ellipsat Corporation's Ellipso System and Loral Cellular System Corporation's Globalstar system (alternative frequency plan no. 2) would employ CDMA spread spectrum transmission techniques in the 1610-1626.5 MHz uplink band.

^{14/} Even though CCI's approach ostensibly would permit multiple entry, it would do so only for systems of similar design. Thus, if CCI cannot prove that its design is superior in every way to the other proposed system designs that also advance the Commission's policy favoring competitive multiple entry, it would be arbitrary and capricious for the Commission to force all of the other applicants to choose between amending their applications to specify an equal or even inferior design, or abandoning their plans to operate RDSS band systems.

TRW's approach, all of the band would be employed by multiple users, whereas CCI contemplates that spectrum would lie fallow indefinitely while it is "held in reserve for future use." See CCI Petition at 11 n.14.

In sum, CCI's proposal for exclusive two megahertz suballocations in the 1610-1626.5 MHz band for spectrum-inefficient FDMA uplink operations should be rejected. Only CCI could operate under such a frequency plan, whereas three of the five applicants could be accommodated under TRW's proposal to require the utilization of CDMA spread spectrum transmission techniques across the 16.5 MHz L-Band segment. At the very least, the Commission should require CCI to demonstrate the superiority of its system design before it even considers imposing a spectrum utilization plan that is incompatible with all other pending proposals.

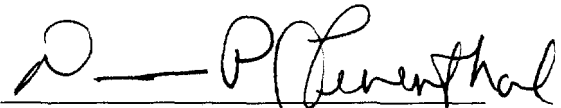
III. CONCLUSION

With the exception of CCI's request for subdivision of the L-Band into two megahertz segments that would be made available for individual applicants' exclusive use, TRW generally supports CCI's petition. Nevertheless, TRW believes that its own proposal for the establishment of the M-E RDSS is the superior proposal, both in terms of the approach suggested and the speed with which it may be implemented. Thus, TRW believes that those suggestions of CCI that are supported above

by TRW should be incorporated into the Commission's rulemaking proposal to establish the M-E RDSS, and TRW's Petition (as so supplemented) should be granted.

Respectfully submitted,

TRW Inc.

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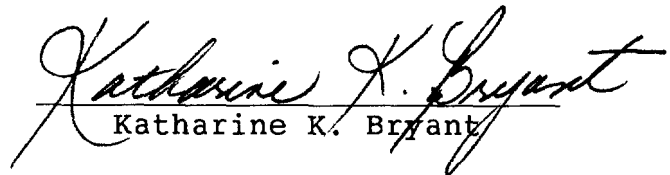
October 16, 1991

Its Attorneys

CERTIFICATE OF SERVICE

I, Katharine K. Bryant, do hereby certify that a copy of the foregoing "Comments of TRW Inc." was mailed, first-class postage prepaid, this 16th day of October 1991, to the following:

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